

U.S. NUCLEAR REGULATORY COMMISSION
REGION I

Report No. 50-289/84-23

Docket No. 50-289

License No. DPR-50 Priority - Category C

Licensee: GPU Nuclear Corporation
P. O. Box 480
Middletown, PA 17057

Facility Name: Three Mile Island Nuclear Station, Unit 1

Inspection At: Middletown, PA

Inspection Conducted: August 3, 7-10, 1984

Inspector: *D. L. Capton*
D. L. Capton, Senior Technical
Reviewer

9/11/84
date

Approved by: *L. H. Bettenhausen*
L. H. Bettenhausen, Chief,
Test Program Section

10/2/84
date

Inspection Summary:

Inspection on August 3, 7-10, 1984 (Inspection Report No. 50-289/84-23)

Areas Inspected: Routine announced inspection by a region-based reactor inspector of the licensee's leak reduction program for systems outside containment, including the quality assurance interface and coverage for the subject program. The inspection involved 30 hours onsite and 4 hours offsite by one region-based inspector.

Results: No violations were identified in the area inspected.

DETAILS

1.0 Persons Contacted

- *R. Barley, Lead Mechanical Engineer
- J. Boyer, Radwaste Operations Engineer
- *J. Colitz, Plant Engineer Director
- D. James, Shift Supervisor
- M. Nelson, Supervisor, Unit 1 Review Program
- S. Otto, Licensing Engineer
- *J. Pearce, Plant Engineer
- J. Pfadenhauer, Operations QA Supervisor
- *H. Shipman, Operations Engineer
- *C. Smyth, TMI-1 Licensing Manager
- P. Snyder, Preventive Maintenance Manager
- R. Summers, Plant Engineer
- R. Szczech, Licensing Engineer
- *R. Toole, Operations and Maintenance Director

NRC

- R. Conte, Senior Resident Inspector
- *F. Young, Resident Inspector

The inspector also held discussions with and interviewed other administrative, engineering, operations and technical personnel.

*Denotes those present at the exit interview conducted on August 10, 1984.

2.0 Previously Identified Items

(Open) Inspector Follow Item (289/84-10-4):

Suspected leak in valve DH-V-5B. The licensee's representatives stated that any repair to this valve required the draining of the BWST (Borated Water Storage Tank). No repairs to this valve had been made or were being scheduled since there were no plans or schedule to drain the BWST. The licensee's representative stated that their evaluation identified no safety concerns with the leaking seat condition of this valve.

(Closed) Unresolved Item (289/83-14-01):

The technical adequacy of the licensee's leakage reduction program procedures and their implementation were made a general unresolved item. Since the focus of this inspection was the same as was covered under the unresolved item 289/83-14-01, this item is closed and the remaining specific unresolved items for this subject area are detailed in this report.

3.0 Leakage Reduction Program

3.1 References

3.1.1 Leak Reduction System Surveillance Procedures

1303-11.16	Revision 16	5/3/84	Decay Heat Removal System Leakage
1303-11.18	Revision 27	4/30/84	R. B. Local Leak Rate Testing
1303-11.27	Revision 1	10/1/83	Makeup and Purification System Leakage Check
1303-11.28	Revision 2	6/13/83	Liquid Waste System Leak Check
1303-11.29	Revision 2	8/11/83	Waste Gas Disposal System Leak Check
1303-11.30	Revision 1	9/22/83	Reactor Coolant Sampling Leakage Check
1303-11.31	Revision 1	5/3/84	Hydrogen Recombiner System Leak Check
1303-11.50	Revision 2	7/25/84	Reactor Building Spray System Leakage Check

3.1.2 Leak Reduction System Flow Diagrams

C-302-640	Revision 34	Decay Heat Removal
C-302-725	Revision 6	Containment Leak Rate Test
C-302-660	Revision 17	Makeup and Purification
C-302-690	Revision 18	Liquid Waste Disposal
C-302-691	Revision 17	Liquid Waste Disposal
C-302-692	Revision 22	Liquid Waste Disposal
C-302-695	Revision 7	Reactor Coolant and Miscellaneous Waste
C-302-719	Revision 28	Sump Pump and Drainage System

3.1.3 Preventive Maintenance Procedures

1027	Revision 12	9/15/83	Preventive Maintenance - Administrative
1407-3	Revision 1	4/23/84	Assessment of the Adequacy of the Preventive Maintenance Program

3.1.4 In-service Testing

1041	Revision 3	1/31/84	IST Systems List and Retest Requirements
1300-3Q	Revision 18	7/11/84	Quarterly In-service Testing of Valves During Normal Plant Operations

3.1.5 Regulatory Bases Documents

NUREG-0578	Item 2.1.6	Post-Accident Control of Radiation in Systems Outside Containment
	Item 2.1.6.a	Integrity of Systems Outside Containment Likely to Contain Radioactive Materials (Engineered Safety Systems and Auxiliary Systems)
NUREG-0737	Item III.D.1.1	Integrity of Systems Outside Containment Likely to Contain Radioactive Material ...
PID 844	Plant Design and Procedures and Separation Issues	
PID 1285	Plant Design and Procedures and Separation Issues	
SID 2031	License Conditions/Technical Specifications to be Imposed at Restart, Item 3	
NUREG-0680	Supplement 3, Item 2.1.6.a, Integrity of Systems Outside Containment	

Technical Specifications 6.9.1.B 3.

Letter J. F. Stoltz to H. D. Hukill dated August 30, 1983.

3.1.6 Licensee's Related Documents

Letter dated May 13, 1981, H. D. Hukill to H. R. Denton forwarding Amendment No. 25 to the TMI-1 Restart Report; see pages 2.1-29b and c.

Letter titled 1982 Annual Report, Additional Information, H. D. Hukill to Regional Administrator, Region I, dated April 13, 1983.

Letter titled Annual Report, H. D. Hukill to T. E. Murley, dated March 1, 1984.

Field Purchase Order GPU to Science Applications, Inc., dated 3/24/84, for services to perform a Helium Leak Detection Test of TMI-1 Waste Gas System.

Letter Science Applications, Inc. to GPU Nuclear Corporation, dated May 15, 1984, providing results of May 8, 1984, Helium Leak Test of Waste Gas Handling System.

Interoffice Memorandum J. R. Pearce to J. J. Colitz, dated July 29, 1983, Engineering Evaluation of Helium Test of TMI-1 Waste Gas System on March 24, 1983.

Quarterly Preventive Maintenance Memorandum to Distribution from P. Snyder, dated August 2, 1984, with Attachments:

- 1) Plant Equipment Failure Profile
- 2) Maintenance Trend Action Notice

3.2 Background

NUREG-0680, Supplement 3, Item 2.1.6.a, Integrity of Systems Outside Containment, reported that the licensee's leak reduction program was acceptable, subject to review of the leakage measurement procedures and a description of the preventive maintenance program. The systems included in the Leak Reduction Program were given as follows:

Makeup and Purification System

Liquid Waste System (to include that portion of the system from the Reactor Coolant Letdown piping to the Reactor Coolant Bleed Tanks)

Decay Heat Removal System

Reactor Building Spray System

Waste Gas Disposal System

Reactor Coolant Sampling System

Reactor Building Containment

Fluid Block System

Miscellaneous Liquid Waste Storage Tank

A letter from NRR dated August 30, 1983, J. F. Stolz to H. D. Hukill, approved the exclusion of the fluid block system and the reactor building local leakage penetration pressurization system since these systems do not contain radioactive materials. The revised program now includes:

Makeup and Purification System

Liquid Waste Disposal System

Decay Heat Removal System

Reactor Building Spray System

Waste Gas Disposal System

Reactor Coolant Sampling - Liquid and Gas

Reactor Building Local Leak Rate Testing

Hydrogen Recombiner System

The licensee has initiated reporting in his annual report (see references, paragraph 3.1.6) information from the periodic Leakage Reduction Program tests required by Technical Specification 6.9.1.B 3. (See paragraph 3.5.1 regarding the Hydrogen Recombiner test procedure.)

3.3 Scope of Inspection

A selective sampling inspection of the licensee's Leakage Reduction Program, its procedures and implementation, was performed. Two systems, the Waste Gas Disposal and the Hydrogen Recombiner Systems, were walked down to assess the adequacy of the system surveillance testing procedures. Individual completed system leakage tests for systems in the Leakage Reduction Program were inspected to ascertain overall program implementation. The Hydrogen Recombiner System and the Waste Gas Disposal System procedures were also inspected to ascertain their adequacy relative to technical specification requirements, licensee commitments, testing practices and testing effectiveness.

The preventive maintenance program was reviewed to ascertain its coverage of the Leakage Reduction Program.

QA monitoring coverage of the Leak Reduction program was inspected to determine if coverage was being provided for the Leak Reduction Program.

The Waste Gas Disposal System was inspected to ascertain that preventive leak rate testing programs were in place to detect intersystem inleakage, that is, leakage out of containment at the containment interface location.

3.4 Surveillance Test Procedures

The licensee's Leak Reduction Program included surveillance testing procedures (listed in paragraph 3.1.1 and below) which are conducted on a refueling frequency interval. The procedures may or may not require performing during an actual refueling. The procedures utilize various leak testing methods which are listed below.

<u>Leakage Reduction System</u>	<u>Surveillance Procedure No.</u>	<u>Testing Method Utilized</u>
Decay Heat Removal System	1303-11.16	Operational hydro
R. B. Local Leak Rate Testing	1303-11.18	Nitrogen or air pressure
Makeup and Purification System	1303-11.27	Operational hydro
Liquid Waste Disposal System	1303-11.28	Operational hydro
Waste Gas Disposal System	1303-11.29	Helium Mass Spectrometer or Nitrogen pressure drop and surface emission bubble test
Reactor Coolant Sampling - Liquid & Gas	1303-11.30	Hydrostatic test
Hydrogen Recombiner System	1303-11.31	Surface emission bubble test with system under air pressure
Reactor Building Spray System	1303-11.50	Operational hydro

3.5 Findings - Surveillance Testing Procedures

The leakage reduction program was found to be satisfactorily implemented via diverse individual system surveillance testing

procedures with the exception of the unresolved items identified in the subparagraphs that follow.

3.5.1 Hydrogen Recombiner System

The hydrogen recombiner system procedure 1303-11.31, "Hydrogen Recombiner System Leak Check," Revision 1, provided no procedural steps covering quantification of identified leakage to provide a basis for meeting reporting requirements of Technical Specification 6.9.1.B 3.a, "Results of Leakage Measurements." Note: There were no leaks identified during the last test conducted on February 11, 1984.

The procedure neither referenced another procedure nor did it contain information describing procedural techniques and details of the surface emission bubble testing to be performed. The procedure provided no information, for example, regarding surface cleanliness, ambient temperature or the illumination conditions under which the testing was to be conducted. The incorporation of steps into the procedure to provide for quantification of leakage and to provide in this procedure or another by reference, a methodology description of the surface emission bubble testing to be performed are an unresolved item (50-289/84-23-01).

3.5.2 Waste Gas Disposal System

The waste gas disposal system procedure 1303-11.29, "Waste Gas Disposal System Leak Check," Revision 2, provided no detailed procedural steps covering the procedural techniques and details for use of the helium mass spectrometer which was used to conduct the test completed on May 8, 1984. The procedure did not reference another procedure providing this coverage. The licensee representative stated that they depended upon a contractor, S.A.I., to operate the helium mass spectrometer and locate leaks. The licensee's representatives stated that they did not have the contractor's helium leak testing mass spectrometer procedure on site. The procedure 1303-11.29, step 6.17, specified a helium concentration for the test to be greater than or equal to 10 ppm. The S.A.I. contractor reported a tracer gas helium concentration of 700 ppm for the test. A calibrated leak, 10^{-6} range (Certificate of Conformance provided), was stated to have been used for calibration of the helium mass spectrometer. The licensee's purchase order (TC-013000) specified that the contractor's personnel shall be qualified in accordance with ANSI/ASME N45-2.6-1978 and SNT-TC-1A to a minimum of Level II capabilities for Mass Spectrometer Leak Rate Testing; however, specific details regarding the qualifications of personnel

that performed the test were not available on site. A statement was reviewed which stated that the testing personnel were qualified to SNT-TC-1A, Level II, and ANSI/ASME N45.2.6-1978.

The 1309-11.29 procedure did not provide definitive acceptance criteria which the allowable measured leak rate should not exceed. The procedure stated that the "...cognizant engineer shall make the final determination as to acceptance or rejection of the reported leakage..."

The following aspects of the helium leakage testing of the waste gas system are an unresolved item (289/84-23-02):

- a. There was no information showing that the minimum concentration of tracer gas helium of 10 ppm stipulated by the procedure is adequate for detection of the smallest leak rate capable of detection by the procedure.
- b. Incorporation of an appropriate reference to the specific helium mass spectrometer test procedure being used or incorporation of a suitable test procedure into 1303-11.29.
- c. Make available for inspection the S.A.I. procedure used for the May 8, 1984, helium leak test of the waste gas disposal system.
- d. Make available details regarding the specifics of the qualifications of the testing personnel involved in the May 8, 1984, helium mass spectrometer leak test of the waste gas disposal system.
- e. Provide acceptance criteria which defines the allowable measured leak rate which should not be exceeded.

3.5.3 Administrative Controls

The overall scope, objectives, responsibilities, and training/qualification requirements of testing personnel for the licensee's leakage reduction program were not delineated in an overall administrative procedure, neither did the diverse surveillance testing procedures contain the total procedural information. This is an unresolved item (289/84-23-03).

3.6 Preventive Maintenance Program

The licensee's preventive maintenance program is administratively covered by Preventive Maintenance Procedure No. 1027. The program is carried out under the direction of a Preventive Maintenance Manager.

The preventive maintenance program provides coverage of the systems in the leak reduction program. Maintenance Procedure 1407-3, Assessment of the Adequacy of the Preventive Maintenance Program, provides for trending and corrective action follow-up of failures. A computer is used to record problems, problem resolutions and provide scheduling information.

3.7 Findings - Preventive Maintenance Program

The licensee's preventive maintenance program has been in place for approximately three years and includes coverage of the systems in the Leakage Reduction Program. A quarterly report (see References, paragraph 3.1.6) is published and distributed by the Preventive Maintenance Manager which includes plant equipment failure profile and trend information. The Preventive Maintenance Manager also tracks resolutions of the identified problems. The inspector had no other questions regarding the adequacy of the program or its implementation.

3.8 Intersystem Leakage

The waste gas disposal system interface connection between the inside and the outside of containment was inspected to determine that isolation valves for the waste gas disposal system were receiving required testing to preclude unacceptable intersystem leakage. The pertinent valves are WDG-V-3 and WDG-V-4.

3.9 Findings - Intersystem Leakage

Valves WDG-V-3 and WDG-V-4 are included in the Reactor Building Local Leakage Surveillance Procedure 1303-11.18 E17 and are being leak tested under nitrogen pressure at 55 psig on a refueling interval. The leakage rate acceptance criteria for these valves are controlled per this procedure by the 0.6L_A local leak rate testing criteria.

The valves are further targeted by the procedure not to exceed 2184 SCCM without engineering review.

Valves WDG-V-3 and WDG-V-4 are included in the licensee's In-service Testing Program - Table B-1 and are tested in accordance with ASME Section XI, Subsection IWV requirements for Category A valves. Subsection IWB-3420 requires leak testing at scheduled refueling outage frequency but not less than every two years.

The inspector had no further questions regarding this matter.

3.10 Quality Assurance Monitoring

A check was made of the Quality Assurance monitoring being conducted on the licensee's Leakage Reduction Program. QA schedules monitoring on a monthly basis for important to safety items.

3.11 Findings - Quality Assurance Monitoring

Two QA surveillance monitoring reports SLS-0305-84 and SRC-305-84, both dated May 31, 1984, were reviewed. These reports verified that the Leakage Reduction Program was being implemented for the systems in the program and that the testing was being conducted within the required frequency. These surveillances also verified that corrective maintenance was being performed when problems were identified.

There were no further questions regarding this QA monitoring.

4.0 Unresolved Items

Unresolved items are matters about which more information is required in order to ascertain whether they are acceptable items, items of noncompliance, or deviations. Unresolved items are discussed in paragraphs 3.5.1, 3.5.2 and 3.5.3.

5.0 Management Meetings

Licensee management was informed of the scope and purpose of the inspection at an entrance interview conducted on August 3, 1984. The findings of the inspection were periodically discussed with licensee representatives during the course of the inspection. An exit interview was conducted on August 10, 1984, at the conclusion of the inspection (see paragraph 1 for attendees) at which time the findings were presented to licensee management.

At no time during this inspection was written material provided to the licensee by the inspector.